



Saving Lives and Property Through Improved Interoperability

***Charleston, South Carolina
Post-Symposium Support Report***

FINAL

March 2002

TABLE OF CONTENTS

1. INTRODUCTION.....	1
1.1 Purpose	1
2. SYMPOSIUM TOPICS.....	2
2.1 Welcome and Keynote Remarks	2
2.2 The PSWN Program Update and Public Safety Wireless Interoperability National Strategy (Public Safety WINS) Video	3
2.3 States Are the Linchpins for Achieving Wireless Interoperability Throughout the Nation.....	10
2.4 Issues Affecting Public Safety Communications	17
2.5 Public Safety Responses to Past Mass Casualty Incidents Highlight the Benefits of and Needs for Interoperability	17
2.6 How Federal Initiatives Are Working to Promote Wireless Interoperability	19

1. INTRODUCTION

The Public Safety Wireless Network (PSWN) Program sponsored the Charleston, South Carolina, Symposium from January 29, 2002, through January 31, 2002. The symposium was hosted by the North Carolina State Highway Patrol and the South Carolina Highway Patrol. Previously, the PSWN Program sponsored similar symposiums in Charlotte, North Carolina; Harrisburg, Pennsylvania; Sacramento, California; Boston, Massachusetts; Chicago, Illinois; Mesa, Arizona; Denver, Colorado; Lansing, Michigan; Orlando, Florida; St. Louis, Missouri; Honolulu, Hawaii; Boise, Idaho; Minneapolis, Minnesota, and Las Vegas, Nevada. The purpose of these events has been to discuss issues related to public safety wireless communications and shared radio systems development.

1.1 Purpose

This report provides a detailed summary of the events of the Charleston, South Carolina, PSWN Program Symposium. It is designed to be a historical resource for those who attended the symposium and to provide a broad overview for those who were unable to attend. In general, this symposium report highlights—

- Key themes that the presentations and panels discussed during various portions of the symposium
- Interoperability challenges and success stories that were discussed throughout the symposium
- Important facts and information that were provided to the audience
- Answers to questions of interest that were asked during the symposium.

This report consists of six sections, each addressing one of the major topic areas presented at the symposium. Each section provides the key themes discussed and explains them using information presented and answers to questions asked during the presentations.

2. SYMPOSIUM TOPICS

The information for each topic area was provided through presentations from members of the public safety community and the PSWN Program representatives. The topics were selected to give the symposium attendees a perspective on the PSWN Program and the state of interoperability at all levels of government. The topics covered are listed below:

- The PSWN Program Update and Public Safety Wireless Interoperability National Strategy (Public Safety WINS) Video
- Public Safety Communications at the Pentagon on September 11, 2001
- Emergency Preparedness During Hurricane Floyd in the Carolinas
- States Are the Linchpins for Achieving Wireless Interoperability Throughout the Nation
- Issues Affecting Public Safety Communications
- How Federal Initiatives Are Working to Promote Wireless Interoperability.

Over the three days, several key themes emerged. In the following sections, each topic and the related themes are presented. The themes are supported by the remarks of the presenters.

2.1 Welcome and Keynote Remarks

At the Charleston Symposium, 212 public safety officials from around the country assembled to discuss various topics relating to public safety wireless communications interoperability. Mr. B. Boykin Rose, Director of the South Carolina Department of Public Safety, and the Honorable Bryan Beatty, Secretary of the North Carolina Crime Control and Public Safety, provided introductory remarks and the keynote address, respectively.

Mr. Rose welcomed the PSWN Program and the symposium attendees to Charleston, South Carolina. He stated that communications interoperability was an important issue and that land mobile radio (LMR) systems must be designed to facilitate interoperability between local, state, and federal agencies. Finally, he noted these systems must be secure and work seamlessly.

Secretary Beatty thanked the North Carolina State Highway Patrol and the South Carolina Highway Patrol for supporting the PSWN Symposium. He said that the capabilities of law enforcement to solve crimes had increased steadily with new technology. In the early 1990s, the State of North Carolina made a commitment to provide information systems and information sharing among public safety officials a priority. Secretary Beatty described the North Carolina Crime Commission's mission as providing quality data and criminal justice agency integration via information systems and technology that would maximize the efficiency and effectiveness of the criminal justice process. The Information and Technology Committee program priorities were the development and implementation of the 2002 information system Criminal Justice

Information Network (CJIN)–Statewide Infrastructure. He explained that CJIN would be used primarily as a statewide support network to help construct the CJIN Infrastructure and to build the information highway that would be used by all agencies in the State of North Carolina, including local, state, and federal agencies.

Secretary Beatty affirmed that the taxpayers expected public safety officials to protect them from criminals and also expected to receive assistance in manmade and natural disasters. During Hurricane Floyd, the National Guard, state and local officials were deployed to assist the citizens of North Carolina. He pointed out that such incidents required a concerted effort and efficient use of limited resources. As an example, he noted that response coordinators should not have to carry five walkie-talkies to do their jobs.

Secretary Beatty provided an example of how the lack of interoperable communications systems threatened the efficient operation of criminal justice agencies. Just hours after killing five family members, a suspect fled the county where the homicides were committed but was arrested for public drunkenness in an adjacent county. Due to poor communications, the suspect was released. This was yet another example of inadequate communications interoperability. In closing, Secretary Beatty added that funding, understanding the needs for interoperability, and the importance of regional cooperation was essential for life and safety.

2.2 The PSWN Program Update and Public Safety Wireless Interoperability National Strategy (Public Safety WINS) Video

Over the past several years, the PSWN Program has worked with the public safety community at the local, state, and federal levels to improve public safety wireless communications interoperability. During the symposium, the PSWN Program representatives described the vision for the program and several of the key activities being performed by the program. Four key themes, described in detail below, emerged during the discussions in this topic area. These themes were evident in the PSWN Program update and the discussion on the technical solutions that the PSWN Program was developing. These topics were presented on the first day of the symposium.

Saving Lives and Property Through Improved Interoperability

The PSWN Program envisions seamless, coordinated, and integrated public safety communications for the safe, effective, and efficient protection of life and property. Specifically, the program focuses on improving wireless communications interoperability among public safety entities at all levels of government. The PSWN Program is a federally funded program, jointly sponsored by the Department of Justice (DOJ) and the Department of the Treasury (Treasury). The program works in partnership with local, state, federal, and tribal public safety agencies to improve interoperability.

The PSWN Program is divided into two phases. Phase I, PSWN Implementation Planning took place from fiscal year (FY) 1997 through FY 2001. During Phase I, the PSWN Program performed an integrated set of studies and evaluations of existing public safety wireless

interoperable radio systems and developed pilot projects. These activities resulted in a knowledge base known as Public Safety WINS.

Public Safety WINS presents the program's strategy for improving interoperability throughout the Nation. Public Safety WINS will serve as an information baseline for the program as it offers interoperability services to local, state, federal, and tribal public safety entities. Public Safety WINS is a multimedia package that includes a video and a CD-ROM. The video portion of Public Safety WINS was shown at the beginning of the Charleston Symposium.

During Phase II, PSWN Interoperability Assistance, the program is offering a suite of services that assist the public safety community in executing Public Safety WINS. These services include providing an information clearinghouse and offering interoperability assistance to public safety agencies with specific interoperability issues. Phase II takes place from FY 2002 through FY 2006.

Improving Interoperability Requires Comprehensive Coverage of Key Issues

The PSWN Program is active in five key issue areas that must be addressed to improve interoperability. The issue areas, and how the PSWN Program is addressing them, are highlighted below.

- **Coordination and partnerships.** Improved coordination and partnerships within the public safety community are critical to improving interoperability. In an effort to facilitate new partnerships, the PSWN Program provides briefings at annual conferences of national public safety associations. The program also hosts regional symposiums to bring together public safety officials to share their ideas and experiences with others. The program and the National Institute of Justice co-hosted a National Interoperability Forum in October 2001, which gathered state decision makers, elected and appointed officials, and public safety executives to encourage the policy community to initiate or continue steps to improve interoperability along with pursuing a public awareness communications campaign.
- **Funding.** Limited funding for communications is a major issue faced by the public safety community. The program has developed reports and guides that highlight the issues related to upgrading and replacing public safety wireless systems and discuss sound funding strategies for the life cycle of a communications system.
- **Spectrum.** The PSWN Program recognizes that spectrum is a limited resource. The program is supporting efforts to acquire more spectrum for public safety and to enact rulings that allow interoperability.
- **Standards and technology.** The development of standards and open-systems architectures is a key issue that must be addressed to make progress toward improved interoperability. The program also partnered with the Criminal Justice Information Services Division of the Federal Bureau of Investigation (FBI) to assess the

integration feasibility of National Crime Information Center 2000 through its Wireless Applications Test Program of hardware and software. Recently, the program also compiled a communications lessons learned and best practices report on the response to the terrorist attacks on September 11, 2001.

- **Security.** To ensure that its communications systems are secure, the public safety community needs to incorporate both physical and system security measures so that public safety agencies can effectively and efficiently carry out their critical operations. PSWN Program staff members have developed recommended security guidelines for LMR systems and are designing a security policy and security planning templates to assist radio managers in the design of their system security policies and procedures.

The PSWN Program Is Seeking to Provide Direct Interoperability Support to the States

The program recognizes that the states are the linchpins for implementing interoperability throughout the Nation. Therefore, the program is seeking to provide direct support to individual states by initiating a dedicated state interoperability assistance campaign. The objective of the campaign is to encourage the trend toward statewide systems development and to provide leadership and expertise on interoperability issues. As a part of the state campaign, the program will work to establish or participate in forums tasked with improving public safety wireless communications with their respective states. The PSWN Program activated interoperability assistance projects in the following states:

- **Alaska:** Working with state officials to create an intergovernmental partnership to develop the Alaska Land Mobile Radio statewide system.
- **Arizona:** Working with state officials to initiate an education and outreach strategy to cultivate support for a statewide system.
- **Idaho:** Providing a spectrum efficiency analysis to state officials to determine the feasibility and benefits of splitting current state licensed ultra high frequency (UHF) frequencies
- **Mississippi:** Assisting state officials in forming a strategic plan for statewide systems development
- **Tennessee:** Assisting state officials in developing a strategic approach to regional communications problems in ways that support statewide interoperability
- **West Virginia:** Assisting state officials in establishing a statewide working group on interoperability and developing a strategic plan for a new statewide system
- **Wyoming:** Assisting state officials in analyzing, identifying, and assembling a favorable business case strategy for a shared, statewide public safety communications system.

Technical Solutions for Public Safety Wireless Communications Interoperability Are Available Today

The PSWN Program is working with local, state, and federal entities to conduct interoperability pilots throughout the Nation. These pilot projects allow the PSWN Program to demonstrate interoperability solutions on active systems. The program hopes that these pilots will help initiate future development of interoperable systems. Pilot projects are under way in Salt Lake City, Utah; along the Southwest border; along the Vermont/New Hampshire border, and in Washington, DC. In addition, the program is assisting the State of Montana and has recently completed pilot projects in San Diego, California, and South Florida. These pilot projects were discussed in detail during the symposium. Brief descriptions of the pilot activities are provided below:

Southwest Border: Linked Proprietary Trunked Systems—The PSWN Program worked with the Southwest Border Integrated Program Team (IPT) to develop an interoperability solution in the El Paso, Texas, and Las Cruces, New Mexico, areas. This pilot involved interconnecting two 800 megahertz (MHz) trunked radio systems from different manufacturers, each with proprietary protocols. The City of El Paso uses a Motorola system while the City of Las Cruces uses an Enhanced Digital Access Communications System. Each city's trunked radio system previously interoperated only with local systems within its own coverage area. The pilot allowed for interoperability not only between the two cities, but also with the other agencies that had interoperable access to the cities' trunked radio networks. The design called for remote trunked desktop console radios for each system to be collocated at the other system's existing trunked sites (with the appropriate connection to the neighboring dispatch console electronics). In this configuration, the desktop console radios can then be under the full control of the neighboring system managers. To facilitate interoperability, the radios were programmed for an interoperability talk group allowing connectivity with the neighboring city. The interoperability talk group can also be linked to other local, state, and federal users, depending on the availability of other base stations presently linked to the console electronics in either system. The PSWN Program has conducted end-to-end tests of the pilot solution in Las Cruces, New Mexico, and El Paso, Texas. This pilot provided a unique solution for interoperability between proprietary trunked systems. The PSWN Program has implemented a fixed site talk-group-to-talk-group or conventional-channel-to-talk-group interoperability link that allows subscriber units in one city to talk to subscriber units in another.

Montana: Consolidated Communications Site—The PSWN Program worked with the State of Montana and its Montana Public Safety Communications Association to develop a consolidated tower site at Palisades Ridge near Red Lodge, Montana. The site was developed to demonstrate shared systems development between local, state, and federal public safety agencies in the Carbon County area. Participants included the Montana State Department of Transportation (DOT), Montana State Department of Justice, Montana State Highway Patrol, Montana State Lands, Carbon County, Bureau of Land Management (BLM), U.S. Forest Service, and the FBI. The new shared site combined the functionality of the existing BLM and DOT

sites. The BLM site included a guyed 50-foot tower and an associated equipment shelter. The DOT site included a guyed 30-foot tower and an associated equipment shelter. The consolidated site replaced the existing towers with a single self-supporting 50-foot tower and an associated equipment shelter. This shared site also reduced the number of antennas needed for the user systems from 14 to 7. The pilot established a process that can be repeated at several sites across the state.

New Hampshire/Vermont: Interstate Interoperability—The PSWN Program supported efforts to improve radio communications interoperability between the states of Vermont and New Hampshire. Specifically, the program participated in an interstate working group consisting of representatives of the Vermont Division of Public Safety Communications Office and the New Hampshire Department of Safety, Division of State Police Communications Office. The main objective of this project was to implement a solution that allows users to cross into the other state and talk either on their “home” system or on the other state’s system. After reviewing the radio sites needed to provide coverage between the states and identifying required system modifications and/or improvements, the working group determined that very high frequency (VHF) mobile radios would be installed in Vermont police cruisers to complement their existing UHF radios. The VHF mobile radios were programmed with New Hampshire State Police frequencies to allow interoperable communications between the two states over the New Hampshire infrastructure. A microwave link was also added between the two state systems to provide a high-speed communications connection.

Pittsburgh: Trunked VHF LMR System—The PSWN Program and the Pittsburgh IPT explored the feasibility of creating a trunked, VHF, Project 25-compliant, interoperable LMR system in the Pittsburgh area. This system was envisioned to support federal public safety agencies in an area encompassing Allegheny County and the City of Pittsburgh. The Program developed a Request for Proposals (RFP) designed to demonstrate an integrated federal LMR network and increase the community’s understanding of trunking technologies, LMR standards, and various methods of interoperability. However, of the nine vendors initially contacted, only one submitted a proposal for the project. This proposal did not fully meet the RFP specifications, which specifically requested that the system be fully compliant with Telecommunications Industry Association/Electronics Industry Alliance-102 (Project 25) standards. The IPT decided that the specifications contained in the Pittsburgh RFP were valid and that the vendors were unable to comply fully with the RFP. The solicitation for the Pittsburgh proof-of-concept test system was canceled on January 18, 2000.

However, the IPT and the PSWN Program decided to reconsider implementation when future evidence indicated sufficient advancement had been made in LMR technology such that vendors could meet the identified requirements without expending additional resources on continued research and development. After the necessary advancement had been made, the IPT would then be justified in re-starting the project (see *Pittsburgh LMR Case Study: Pilot System Operations Report*, dated March 2000, for more details). Subsequently, in November 2000, the PSWN Program decided to continue to implement a trunked, VHF high-band pilot test in Pittsburgh, Pennsylvania, and the surrounding Allegheny County. In support of this decision, the PSWN Program reestablished the IPT in order to revise the initial RFP and provide oversight of implementation. However, in July 2001, the PSWN Program and the IPT realized that the

funding needed to support this pilot was not sufficient. Thus, the IPT opted to suspend any further progress until more funding was available. In the interim, however, the PSWN Program recognized the value of this RFP to the community and decided to share a generic version of the RFP so any agency could use it in developing a tailored RFP.

Salt Lake City, Utah: Cross-System Interconnect—The PSWN Program is working with the Utah Communications Agency Network, Salt Lake County Sheriff's Office, DOJ, and Treasury. These agencies comprise the PSWN Program Salt Lake City Pilot Coordinating Working Group (CWG). The CWG charter is to improve interoperability and increase flexibility for the entire Salt Lake County public safety community by implementing a cross-system interconnect solution. This effort will support interoperable communications for the public safety and law enforcement community.

Specifically, this is a two-tiered pilot. The first tier will provide connectivity between several area dispatch consoles via base station interface module (BIM)-to-BIM patches. In effect, this will provide system interoperability to field users operating on different radio systems. The second tier, which will take effect after the conclusion of the 2002 Winter Olympic Games, will interconnect two independent 800 MHz SmartZone trunked systems using the Motorola SmartZone OmniLink switch. This switch was chosen for this network because it can link the multiple independent Motorola SmartZone systems in the Salt Lake City area into a single, very wide area trunking system. The pilot is also exploring the use of shared talk groups to improve interoperability among federal agencies in the area. Additionally, agencies outside the network operating conventional, non-trunked systems can achieve interoperability with an OmniLink network through different patching schemes that include a permanent patch that is a direct connection into a mutual-aid channel or designated interoperability channel, dispatch-assisted console-to-console patching, or through the use of a VHF trunked intelli-repeater base station.

San Diego: Transportable Communications System—The PSWN Program and its San Diego IPT piloted an innovative interoperability solution known as the Transportable Communications System (TCS). The TCS demonstrates crossband interagency communications among disparate public safety entities. Specifically, the TCS uses a JPS Communications, Inc. ACU-1000 audio switch, which is installed in a mobile command vehicle, to provide interoperability among the participants. The mobile nature of this pilot solution works to provide interoperability among first responders, supplement or extend the coverage of fixed infrastructure systems, and enhance local, state, and federal interoperability during emergency situations and special events. The solution was successfully demonstrated during a tabletop exercise in May 2000.

Based on the lessons learned from the TCS, the PSWN Program piloted the Transportable Public Safety Radio Interoperability Unit (TPSRIU). Like the TCS, the TPSRIU uses an audio cross-connect switch to link disparate public safety agency radio systems. The essential difference between the TPSRIU design and the TCS design is in how each device is packaged to accommodate different applications. While the TCS was designed for mounting into a relay rack permanently installed in a mobile command vehicle, the TPSRIU was designed for mounting into transit cases that could be transported to wherever needed. Additionally, the TPSRIU was

designed with a separate power source enabling operation where 110 volts alternating current power is available. The TPSRIU solution was successfully demonstrated in six locations.

South Florida: Console-Console Patch—The PSWN Program worked with the South Florida IPT to implement an interoperability solution in three southern Florida counties: Monroe County, Dade County, and Broward County. The pilot's objective was to address communications challenges that could arise during a mass migration of refugees. The pilot used a two-part solution to demonstrate interoperability between the local, state, and federal IPT agencies using disparate conventional and trunked radio systems in several different frequency bands. The fixed solution used leased four-wire radio control circuits to link designated dispatch consoles together. Each participating agency established a circuit that connects to the Immigration and Naturalization Service's (INS) dispatch center at Pembroke Pines, Florida. The INS dispatcher can arrange the connectivity, as requested by the other agencies, using the patching function of the INS console electronics bank. The mobile solution used a mobile audio switch package designed to extend interoperability to areas outside current coverage areas. This solution operates similarly to the fixed solution component, except the equipment is mounted in a mobile platform such as a trailer or mobile command post. This console-to-console patch solution allows subscriber units from different agencies to communicate directly via their own equipment. This solution was successfully implemented in August 2001.

Southeast Louisiana: Maritime Interoperability—The PSWN Program is working with the Maritime IPT to improve maritime wireless interoperability in southeast Louisiana. During the program's data collection efforts, several interoperability gaps were identified in maritime public safety communications. Common obstacles encountered included funding, coverage, and use of different frequency bands. In response to these problems, the program is exploring interoperability options, assisting in establishing new partnerships, and identifying methods for maximizing available funding.

The piloted efforts consist of three phases. The first phase is the development of a Regional Maritime Wireless Interoperability Strategy. This step includes the development of a multiagency strategy that would help public safety agencies increase coordination and promote long-term wireless interoperability by raising awareness of the many alternative approaches to system management, funding, and technology integration. The second phase is the piloting of a VHF-to-800 MHz radio frequency (RF) link that involves interfacing conventional VHF and trunked 800 MHz systems via RF to provide maritime-to-inland agency communications. The final phase is the development of a multiagency mobile data strategy that would help public safety agencies achieve wireless data interoperability, establish a standardized vision for interagency data exchange, and promote the sharing of mission-critical public safety information.

The Native American Tribal Nations Interoperability Assessment—The PSWN Program has concluded the data collection process and is drafting the Tribal Nation/Native American Reservations Study Results and Recommendations Report. Approximately 12 tribes and the agencies they interoperate with are included in the report, which is scheduled for distribution within the first quarter of 2002.

Washington, DC: LMR Pilot—The objective of this pilot had been to demonstrate interoperability in a dense urban area using multiband, low power transmitter sites. Work was under way to finalize the location of these multiband sites and to identify and purchase the equipment that was needed. However, it became clear to the PSWN Program and the Washington, DC, IPT that this approach would not work in the region because of the lack of VHF radio spectrum available for interoperability.

After September 11, the whole approach was reevaluated to include the installation of communication switches (i.e., ACU-1000) at selected locations. The new plan consists of patching together radio systems of participating agencies thus providing wider area coverage to include all of the regions' public safety responders. Currently, work is being done to identify the appropriate locations for these switches, determine exactly what equipment would be needed, and develop an operational plan for the use of the switches.

Washington, DC: In-Tunnel Interoperability—As part of the program's Washington, DC, pilot, the PSWN Program assisted efforts by the District of Columbia Fire and Emergency Medical Services Department (DCFD) to improve interoperability among emergency personnel within subway system tunnels. The DCFD provides services to the Washington Metropolitan Area Transit Authority Metrorail subway system, an environment in which radio coverage has historically been poor and difficult to enhance. During Metrorail fire or rescue incidents, first responders from different agencies provide assistance to the DCFD responders. These agencies, however, rely on radios operating on frequency bands other than DCFD's frequency band. To address this problem, the PSWN Program and DCFD implemented the Incident Commanders Radio Interface (ICRI).

The ICRI solution provides a portable interoperability device that is easy to use and set up, enhances radio communications in subway tunnels, and is capable of linking DCFD radios to radios of other public safety agencies responding to a subway incident. Through the ICRI, DCFD has achieved a highly portable, crossband and cross-system capability for mutual aid operations that ensures reliable radio links for emergency response teams in Metrorail tunnels.

2.3 States Are the Linchpins for Achieving Wireless Interoperability Throughout the Nation

Statewide infrastructures are quickly becoming the most efficient, cost-effective way to improve interoperability around the country. Planning statewide systems, however, is a difficult task. Many states have implemented, or are implementing, shared, statewide systems. During the symposium, representatives from Illinois, Michigan, South Carolina, and North Carolina related their experiences with statewide systems development. Several key themes, described in detail below, emerged during the discussions in this topic area.

Obtaining Funding for Large, Statewide, Wireless Communications Systems Is Possible

Obtaining funding is the critical first step in making statewide systems a reality. Acquiring the substantial funding needed to plan, build, and maintain a public safety communications system may be one of the greatest challenges for public safety agencies. In fact,

this process often takes more than 10 years to complete. Another problem is that agencies do not typically consider life-cycle cost issues when planning a system; therefore, they encounter unanticipated costs during the system's life. As states have proceeded through this process, several common keys to success have emerged. During the symposium, officials who have funded statewide systems shared some of these keys to success with the audience. These included—

- Agencies must develop a core funding team. Ideally, this team would include representatives from the fields of law, finance, and accounting.
- Officials planning statewide systems should enlist consultants to help them develop business plans and validate the large dollar amounts needed for system development. Business plans must describe, in detail, what efficiencies will be gained and what services can be improved by using the new system. Consultants can also help to sell the business plan at county meetings and board meetings.
- Agencies often have a misconception that buying a radio system is a one-time purchase. As a result, they fail to realize that costs do not end when construction does. Agencies should be aware that they need to cost these systems for their entire life cycles. Investing in upgrades is becoming an easier sell because people realize technology becomes obsolete quickly.

Federal and state grants are another mechanism states can use to fund interoperable systems. One such grant, administered by the National Telecommunications and Information Administration (NTIA), helps county and local governments to set up demonstration projects. In addition, NTIA provides matching funds for states to help them maintain their systems. This funding source also raises the level of awareness at the state and local levels that the Federal Government is interested in advancing technology in the public safety sector.

State of Illinois

The Illinois State Police (ISP) is one of many public safety agencies faced with replacing an aging communications system that is nearing obsolete. To address this issue, the ISP has replaced its existing LMR system with a leased system. Rather than procuring, owning, and operating a new system, the ISP has leased a vendor-owned, operated, and maintained system.

Background. The ISP began developing a plan for replacement of its LMR system in 1994. An independent consultant performed a study to determine the cost of procuring a new LMR system covering a six-county area. The results of the study were presented to the governor's office for budget approval, but the project was considered cost prohibitive. The ISP then considered partnering with the local utility company, which had extensive infrastructure throughout the state but did not have adequate spectrum to support the number of proposed users. This arrangement would have required the ISP to allow non-government entities to use its frequencies. The ISP did not feel this arrangement best served its interests and rejected this solution.

Ultimately, ISP officials considered a commercial option. They recognized that commercial entities already provided most of their communications capabilities, such as paging and wireless data. As a result, a commercial LMR system was viewed as a service they could possibly pursue.

The ISP released a performance-based RFP through the Illinois Central Management Service. This RFP stipulated that a vendor would build, operate, and maintain a voice communications system for use by the ISP, the Chicago Police Department, and any other government organization within the State of Illinois.

The State of Illinois possesses a number of valuable resources that make a lease arrangement favorable for the vendor and the state. First, the ISP has been granted \$25 million through the Illinois Fund for Infrastructure, Roads, Schools, and Transit (FIRST) project to fund the initial capital cost of the user equipment. Illinois FIRST funds are issued through the governor's office and are intended to revitalize critical infrastructure within the State of Illinois. This significant amount of start-up money considerably mitigates the ISP's funding challenges.

Another resource that the ISP offers to the vendor is real estate. The State of Illinois owns a considerable number of radio towers and sites throughout the state, which the vendor in turn can use for site development or infrastructure installation.

Finally, frequencies already licensed to the ISP will be reused whenever possible. The ISP realizes a significant monetary value is associated with this resource and expects the vendor to note the value in its discounted pricing for the ISP.

System Details. The ISP has leased a trunked, 800 MHz LMR voice system capable of providing interoperable communications with other public safety providers. This system provides 95 percent statewide coverage. The contract states that the system must accommodate expanded users and provide flexibility for growth and special needs. The system is security encrypted.

Motorola's solution, the Starcom 21 system (built and maintained by Motorola), is accessible to all levels of public safety agencies (i.e., local, state, federal) throughout the State of Illinois. The ISP lease is 10 years for voice traffic only. Although Motorola owns and maintains the system, the ISP will be the primary administrator of the system (e.g., adding users and assigning talk groups).

Contract Provisions. The ISP developed the contract using PSWN Program research and best practices guidelines designed for local, state, and federal public safety providers. As stated, it is a voice-only system. The contract requires Motorola to provide an operational statewide system within 36 months. The contract guarantees 95 percent or greater coverage for the grade of service (10 years). All provisions are guaranteed for the life on the contract.

Interoperability. The Starcom 21 system is a virtual shared radio system that facilitates interoperable communications. Although owned by a vendor, the system is available to all

government organizations in the State of Illinois. The arrangement enables participating organizations to contribute resources (e.g., frequencies and towers) where feasible. Resource sharing promotes cost savings and interoperable communications, and prevents organizations from establishing isolated, redundant networks.

The ISP does not perceive loss of control as an issue. Although the vendor owns, operates, and maintains the system, the ISP will serve as the administrator. The ISP set the performance criteria for the system and conducted its own tests of the system. System reliability is determined entirely by the ISP. The ISP has also indicated that although the vendor will build and own the system, any upgrades to the infrastructure will belong to the ISP when the lease expires, at no cost.

Summary. The Starcom 21 system is embraced by public safety agencies throughout the state. All agencies within the state, including federal agencies, will be able to join the lease agreement. The new system will alleviate funding challenges faced by many smaller agencies and municipalities that do not have the resources to establish their own systems. More importantly, agencies will now be able to communicate on a single system, improving interoperability and coordination during emergency incident responses.¹

State of Michigan

The State of Michigan has been a leader in developing statewide systems. The Michigan State Police (MSP) is serving as the lead agency in developing a digital, trunked, Project 25-compliant, 800 MHz system for use by all state agencies and interested federal agencies and local governments. The primary vendor for the system is Motorola. The key feature of the system is that it provides intra-agency interoperability statewide. The state funds the communications infrastructure, whereas federal and local agencies that want to participate on the system provide their own end-user equipment. The cost of the system is approximately \$221 million.

Michigan's system is comprised of four phases. MSP is in the fourth phase of the build out. There are 181 sites in five zones. Phase four covers the east and west areas of the Upper Peninsula. The 61 towers in this phase are under construction. The system currently has more than 8,000 radios from all levels of government. An additional 12 local jurisdictions intend to join the system. As new participants join the system, they discover the benefits of a shared system; and as members, they incur only minimal costs to use the backbone of the statewide system. Today, the Michigan system has increased user capacity (64,000 user IDs and 16,000 talk groups) and simulcast capability. It has also improved interzone bandwidth, long-term support, networked management, and fault management. Future platform capabilities include improved scalability, support for use of 700 MHz channels, use of advanced encryption standards, multiple frequency bands, packet-based consoles, over-the-air rekeying for encryption, and alphanumeric text service.

¹ PSWN Program, *Fee-for-Service Report*, October 2001, page 15.

The state has a full-time staff that maintains the system and the equipment that is part of the infrastructure. The state also provides a hands-on user training program, having found that users needed to be retrained after receiving inadequate training from other groups. For more information on the Michigan system, interested parties can visit its Web site at www.mpscs.com.

***South Carolina Department of Public Safety 800 MHz Communications—
Public-Private Partnership***

In 1991, Hurricane Hugo's devastating impact on the State of South Carolina created a critical need for statewide emergency radio communications. As a result, SCANA Communications and several state and local agencies jointly developed an LMR system. SCANA Communications offered an existing system to the government agencies as a foundation for the statewide system. During the initial planning phase, the original system was used by state utility organizations. Initially formed as a cost sharing "for-profit" system, the SCANA system was expanded by combining government resources, existing SCANA infrastructure, and numerous new sites and towers. In 1995, however, SCANA Communications and the State of South Carolina entered into a contract that restructured the system as "not-for-profit." With the advent of the new structure, a formal users group, consisting of representatives of various public safety agencies, was created to set policies regarding system usage and functionality. This group is committed to improving interoperability and using technology to overcome the limitations of legacy VHF and UHF systems.

System Overview/Security. SCANA Communications, a subsidiary of the SCANA Corporation, operates an 800 MHz Motorola Type II mixed mode Astro SmartZone trunked mobile radio network. Encryption is available in the digital mode for appropriately equipped users. Designed initially to support up to 2,000 users, the system currently supports approximately 10,000 users, and 44 agencies. A variety of organizations use the SCANA system, including public safety and public works agencies, hospitals, local power utilities, and other state agencies. To become an active SCANA user, few mandates exist. To be considered eligible, the requesting agency must be a local, state, or federal government agency; power utility; special emergency; or special-purpose service district organization. The eligible agency must sign a system user agreement and pay the required fees. As defined in the state contract, these fees are based on the number of sites an agency is expected to access. In some cases, user fees can be negotiated if the agency contributes infrastructure to the system. Federal agencies such as the FBI and the National Guard have expressed an interest in using the SCANA system; however, the recurring monthly fee may be a barrier to federal use.

Expansion. The participating agencies and SCANA Communications share the burden of system expansion. The government agencies must identify funding streams, whereas the vendor is charged with implementation and operations and maintenance (O&M) responsibilities associated with expansion requirements. Previously, a state-level Public Safety Communications Coordination Committee recommended expanding the SCANA system to cover the full geographic area of the state. To support this system expansion, an adequate funding mechanism is needed. The state is focusing on the fees collected from private sector companies leasing airtime on state-owned wireless network towers. These fees are incurred by several major

wireless carriers. To further this effort, the state Office of Information Resources issued an RFP soliciting plans for the implementation and development of a uniform asset management program for existing and future county-owned towers.

Interoperability. Many agencies choose to join the SCANA system to take advantage of the trunked, shared features that otherwise would be unaffordable if built as a privately owned and maintained system. The SCANA system is developing links to regional trunked radios systems, including those deployed in Beaufort/Hilton Head, Charleston, Myrtle Beach, and Florence. In support of interoperability with other 800 MHz systems, mutual-aid agreements and 30 preset mutual-aid talk groups have been established statewide.

Operations and Maintenance. SCANA Communications performs O&M. The vendor maintains the infrastructure and will assist with programming services for participating agencies. Furthermore, the vendor ensures that technical and support resources are available to all agencies on demand. However, the owning agency bears the responsibility for maintaining subscriber equipment. This responsibility may require retaining an internal technical repair staff or establishing a maintenance agreement with local repair shops.

Future Outlook. The SCANA Corporation sold the system to Motorola in June 2001. Motorola will be completing the system expansion and plans to refurbish or replace some of the existing infrastructure and equipment for full digital operation. Motorola has committed to a statewide build-out within 18 months. This transaction is viewed as favorable for agencies using the SCANA system.²

Public Safety Agencies Must Consider Several Key Issues When Planning Statewide Systems

Planning statewide systems can involve technical issues, political considerations, and coordination with peers in other organizations. As states nationwide have completed this process, several best practices have emerged. During the symposium, representatives from various states shared their experiences and some of these best practices, as detailed below.

- **Executive-level support.** Senior government support is critical for successful statewide systems. Political champions can give a project credibility, ensure funding for the project's survival, and defend the project in the face of opposition. These individuals also provide needed support during the legislative process and for requests for funding public safety wireless communications systems.
- **Buy-in from local entities.** Most successful statewide system groups have found ways to involve local agencies in gaining support for system development. Well-developed and consistent presentations to important existing and potential stakeholders, including the use of professional quality videos, help obtain and maintain buy-in from the government executives, legislatures, the citizenry, and other key stakeholders.

² Ibid., page 17.

- **Memorandum of understanding (MOU).** An MOU is a detailed agreement that describes the purpose and intent of the shared system, defines the users, and defines the owner/operator responsibilities. MOUs are sometimes used to forge partnerships and are instrumental in the early stages of planning and partnering. The MOU often serves to open communication lines.
- **A shared vision.** A compelling vision, with an understanding of the urgent need to improve public safety communications, is required to achieve the needed level of support. Furthermore, the state must be willing and able to assume integration responsibilities for the system and work to overcome turf and coordination issues with local and federal partners.
- **Site acquisition.** Public safety agencies should be aware of environmental and land-use regulations as they prepare to develop their sites. Local governments often have stringent limitations on tower siting and resolving such issues can be difficult and time consuming.

States Are Developing Wireless Data Networks as a Means to Achieving Interoperability

A number of wireless data systems are being developed nationwide. These systems are providing an alternative way to address many interoperability challenges. The speaker from North Carolina highlighted their statewide data system during the symposium. The system is described below.

State of North Carolina

Criminal Justice Information Network (CJIN). The State of North Carolina is implementing an 800 MHz private data network known as the CJIN. The goal of CJIN is to make mobile data available to all public safety agencies within the state. Its stated objectives include improving officer safety, increasing officer efficiency and effectiveness (i.e., reduce paperwork, reduce errors, and achieve better use of staffing), and improving interoperability. North Carolina elected to build its data system privately because cellular coverage was not available in all areas.

To date, the state has implemented the system on 114 base stations. More than 500 law enforcement agencies and a total of more than 5,000 users are now using the system. Approximately 95 percent of the state is currently covered. The cost of the project will be about \$16 million. The state was able to keep the cost low because the system was built with shared resources. The state provides the base stations, data transmitters, and access to the 800 MHz system while local agencies provide tower space, tower houses, and use of spare 800 MHz frequencies available in their area.

2.4 Issues Affecting Public Safety Communications

A Standards Update: APCO 39-Interference to 800 MHz Public Safety Radio System

Ms. RoxAnn Brown, Chair, Association of the Public-Safety Communications Officials International (APCO) Project 39 Committee, provided a comprehensive overview of the Project 39 mission, goals, and status updates on current activities. In April 2000, the Federal Communications Commission (FCC) called for the establishment of an industry task force to examine the interference issues involving commercial wireless services providers and public safety 800 MHz radio systems. Partners involved in exploring a solution include representatives from public safety system operators, commercial system operators, manufacturers, and the FCC.

Ms. Brown said the initial goal was to have current public safety 800 MHz interference issues cataloged within six months. This would include how the problem manifested itself, who the contact parties were for the public safety agency affected, what was causing the interference, how long the interference had been occurring, and what, if anything, had been done. Ms. Brown said APCO 39's goal was to test and provide multiple, reality-based, short-term (less than 12 months), mid-term (less than 24 months), and long-term solutions for eliminating the interference problems. She explained that within 12 months, the goal was to have all potential short-term interference solutions identified, tested, and where applicable, applied. Within 18 months, the goal was to identify all mid-term and long-term solutions and, where possible, tested.

On November 27, 2001, the FCC held a conference call to update the current state of progress of the public safety 800 MHz interference issue and to discuss the interim report submitted to the FCC. The conference call included primary representatives from APCO, wireless carriers, manufacturers, and other associations representing the carriers, as well as several local participants from the FCC. Kathleen O'Brien Ham led the conference call, which included general reports and comments from several participants. Ms. Brown indicated that the public safety community was still waiting for a response from the Commission.

2.5 Public Safety Responses to Past Mass Casualty Incidents Highlight the Benefits of and Needs for Interoperability

The main purpose of this topic area was to highlight how large-scale incidents in various states and regions reveal ongoing interoperability problems. During the symposium, public safety representatives shared their experiences and solutions to incidents with the audience. Speakers included officials who were involved in the actual emergencies. Two key themes emerged in this topic area. These themes are described in detail below.

Various Incidents Highlight Interoperability Challenges Within States and Regions

Every day, many types of incidents occur that reveal the need for a coordinated public safety response. Interoperable communications are vital to the swift resolution of these incidents. Several of these incidents were discussed at the Charleston Symposium. Each of these incidents highlighted the vital role of interoperable communications.

Public Safety Communications at the Pentagon on September 11, 2001. Mr. Steve Souder (Retired Administrator, Arlington County Emergency Communications Center) [ECC]), was responsible for primary radio communications during the Pentagon terrorist attack on Tuesday, September 11, 2001. He provided a detailed account of the coordination and communications used to successfully deploy the public safety assets to the incident scene.

He stated that the successful response effort owed much to the post-event analysis of the crash of Air Florida 90 on the 14th Street Bridge in January 13, 1982. Post analysis of the incident revealed that radio communications were the number one problem because they were chaotic.

On September 11, the staff in the ECC was watching the events occurring at the World Trade Center in New York, wondering whether the White House, the Pentagon, the USA Today building, or the monuments would be next. An Arlington County Police Officer made the first report that an American Airlines jet had crashed into the Pentagon. More than 10 fire units were immediately dispatched to the scene.

ECC staff requested support from officials in Fairfax, Alexandria, and District of Columbia and staged their additional resources close to the Pentagon. Total resources included 24 engine companies. All responding companies operated on an 800 MHz operations channel for four hours. However, when state and federal assets arrived at the scene, they could not communicate with the assets already present because most federal and state agencies were using Nextel or cellular services. Montgomery County, Maryland, had purchased 800 MHz radios that were still in the warehouse. Fortunately, the LMR manufacturer brought those radios to the Pentagon, and they were distributed to the incident commanders to achieve interoperability.

Mr. Souder reported that the Washington metropolitan area had eight jurisdictions with 800 MHz systems covering 2,500 square miles for five million people. He said they were looking for ways to do a better job. In particular, they were looking to the PSWN Program for solutions, specifically use of the TPSRIU as a bridge to achieve interoperability with agencies that did not have an 800 MHz system.

Mr. Souder stated that some of the lessons learned from the Pentagon incident included—

- Agencies must use the cellular priority access service (CPAS).
- State and local agencies must have access to CPAS.
- Public safety agencies must use the incident command system to help coordinate activities during an emergency.

He added that four key components prepared the Washington metropolitan public safety community for the Pentagon incident. The first three were communications interoperability across jurisdictional lines, development of formal protocol and mutual aid agreements, and maximization of the use of emerging technology that facilitated interoperability. Mr. Souder stated the final component was conducting disaster drills with neighboring locales. He affirmed

that the response to the terrorist attack on the Pentagon on September 11 progressed smoothly because of the lessons learned and policies implemented after the Air Florida crash. In closing, he said that most of the public safety agencies in the Washington, DC, area practiced mutual-aid responses on a daily base. The only element that changed on September 11 was the magnitude of the incident.

There Are Best Practices That Can Improve Interoperability During Tragic Incidents

During the Pentagon and Hurricane Floyd incidents, public safety officials were forced to quickly resolve their interoperability problems. Often these solutions, while not optimal, worked. However, the panelists indicated that coordination of day-to-day interoperability among public safety agencies led to successful mutual aid interoperability. Panelists shared several best practices that could help improve interoperability during mass casualty incidents:

- Establish regional communications and mutual-aid plans
- Develop a regionwide incident command system to help coordinate resources
- Establish working relationships among hospitals, fire/emergency medical services, schools, and local law enforcement
- Ensure operational readiness through deployment planning, training, drilling, and equipment acquisition.
- Ensure LMR equipment is uniformly programmed in a common language
- Develop an accountability system across the entire community of first responders.

2.6 How Federal Initiatives Are Working to Promote Wireless Interoperability

Federal agencies have been charged by the U.S. Congress to consolidate communications systems, limit spending, and create interoperable solutions with other federal agencies. Where appropriate, federal agencies intend to partner and share resources with state and local public safety agencies. The main purpose of this topic area was to discuss certain large-scale federal system developments and federal initiatives related to interoperability. One key theme emerged in this topic area. The theme is described in detail below.

Federal Agencies Are Supporting and Promoting Solutions for Interoperability Throughout the Nation

Project SAFECOM-The Office of Management and Budget's (OMB) E-Government Wireless Networks Initiative. Mr. Tom Wiesner, (Director, Wireless Programs, Department of the Treasury) described the project, now called the Wireless Public SAFETY Interoperable COMMUNICATIONS Program, or Project SAFECOM, as one of 23 e-Government initiatives to improve services and operations and to realize savings. He said Project SAFECOM was a government-to-government (G2G) initiative that would focus on the implementation of

narrowbanding, interoperability, and other critical improvements to the wireless communications systems used by public safety officials at all levels of government. The program was designed to accelerate implementation needed to improve the readiness of public safety wireless systems for homeland security and traditional public safety response for federal agencies.

More generally, Mr. Wiesner stated that OMB, working with chief information officers from across the Government, identified and was supporting the 23 e-Government initiatives to improve services and operations for wireless networks and realize savings. He described the initiatives as being in one of four categories:

- G2G, i.e., e-grants, e-vital statistics
- Government to Citizen, i.e., e-filing of income tax, access to loans
- Government to Business, i.e., small business compliance
- Internal Operations.

Through this process, OMB established the improvement of wireless network for public safety as a priority G2G item for the current administration. Mr. Wiesner said that Treasury was the managing partner for the initiative and that Project SAFECOM, as currently envisioned, had two components. The first was an aggressive federal effort focused on the coordinated implementation of a right-sized number of spectrally efficient federal systems and the improvement of federal-to-federal (F2F) interoperability where appropriate. The second component was an expansion of the ongoing PSWN Program to include more aggressive assistance to federal and state agencies and the implementation of federal-to-state (F2S) interoperability links. Project SAFECOM could also build on the implementation of an existing national strategy developed by the PSWN Program (i.e., Public Safety WINS).

Mr. Wiesner pointed out that homeland security was having a significant impact on how public safety agencies did business. Recent events had blurred the lines between public safety and national security and had thrust federal entities into broader public safety roles. There was a heightened need for federal public safety providers to directly communicate with one another and with their state and local counterparts. He indicated that wide-area interoperability within regions was needed and would now likely include communications with nontraditional players such as stateside military installations and the National Guard. Homeland security efforts were renewing emphasis on the spirit of sharing information and resources across government entities.

Mr. Wiesner stated that Project SAFECOM was the most reasonable and cost-effective method of meeting OMB's requirement and homeland security objectives. He said it would—

- Respect the sovereignty of the local, state, federal, and tribal systems of governance in place throughout the United States
- Provide public safety throughout the Nation with the wireless communications tools needed to meet homeland security and traditional public safety challenges
- Include productivity and service enhancements, improved mission delivery, and the reduction of lost lives and property

- Provide additional benefits including potential cost savings, cost avoidance, and cost recovery that total in excess of \$1.3 billion (Federal Government savings) and \$9.3 billion over the 10-year life cycle.

He added that Project SAFECOM would address the Nation's public safety wireless shortcomings and implement the PSWN Program's Public Safety WINS, the wireless interoperability national strategy.

Mr. Wiesner described Project SAFECOM's two components as-

- An aggressive **federal effort** focused on-
 - Coordinated implementation of right-sized number of spectrally efficient systems
 - Improvement and implementation of F2F interoperability where appropriate
- Expansion of the ongoing **PSWN Program** to include-
 - Assistance/implementation of F2S interoperability links
 - Aggressive assistance to federal and state agencies
 - Continuation of existing complement of relevant activities.

He indicated that OMB would provide project oversight, the Treasury Chief Information Officer Office would be the managing partner, and several new and existing bodies would make up the Project SAFECOM partnership.

Mr. Wiesner closed by saying that Treasury began holding high-level meetings to socialize and gain support for Project SAFECOM with wireless stakeholders across the government. He emphasized that this was a collaborative, team effort, and that Project SAFECOM was still evolving.

Attachment 1

Symposium Attendee Roster